



UNIVERSITY OF SASKATCHEWAN
ELECTRICAL ENGINEERING

Assignment Quiz 4
March 20, 2003

Instructor: B.L. Daku

Time: 10 minutes

Aids: None

Name:

Student Number:

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1. A linear time-invariant system is defined by

$$H(z) = (1 - e^{j\pi/2}z^{-1})(1 - e^{-j\pi/2}z^{-1})(1 - z^{-1})$$

The input to the system is

$$x[n] = 5 + 20 \cos(\pi n/2 + \pi/4) + 10\delta[n-3]$$

Use superposition to determine the corresponding output of the LTI system $y[n]$ for $-\infty < n < \infty$.

$$h[n] = (1 - z^{-1})(1 - z^{-1})(1 - z^{-1})$$

$$= (1 - 2z^{-1} + z^{-2})(1 - z^{-1})$$

$$= 1 - z^{-1} - 2z^{-1} + 2z^{-2} - z^{-2} - z^{-3}$$

$$= 1 - 3z^{-1} + z^{-2} - z^{-3}$$

$$\begin{matrix} 1 & -3 & 1 & -1 \end{matrix}$$

$$1 - 3 + 3 - 1 = 0$$

$$y[n] = 10\delta[n-3] + 30\delta[n-4] + 30\delta[n-5] + 10\delta[n-6]$$

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